

What is claimed is:

1. A conferencing system comprising:

at least one client;

a conference server;

network connections between the conference server and the at least one

client, wherein each client maintains a version of a shared portion of a display which is updated at a rate dependent on the network connections and loads and client computing speeds and loads.

10 2. A conferencing system comprising:

at least one client;

a conference server;

network connections between the conference server and the at least one

client, wherein each client maintains a version of a shared portion of a data set which is updated at a rate dependent on the network connections and loads and client computing speeds and loads.

15 3. A computer network system for sending dynamic data to plurality of clients of differing capabilities, comprising:

20 a server;

a plurality of intermediate servers each connected to the server; and

25 a plurality of clients connected to the plurality of intermediate servers, each client connected to an intermediate server, where each intermediate server includes a means for analyzing data streaming from the server and means for dropping elements of the data stream based on network load and speed and downstream client load and speed to maintain a substantially real-time data stream.

30 4. A method of sharing dynamic data between multiple nodes on a network where the dynamic data is updated at a rate dependent on the network connection speed and load and the node computing speed and load, the method comprising the steps of:

outputting data from a source node in an output data type selected from base uncompressed data, base compressed data, differenced uncompressed data and

differenced compressed data, wherein the output data type is selected based on the network connection speed and load and the source node computing speed and load;

inputting data to a destination node in an input data type selected from base uncompressed data, base compressed data, differenced uncompressed data and differenced compressed data, wherein the input data type is selected based on the network connection speed and load and the destination node computing speed and load;

when the output data type is different from the input data type, transforming the output data from the output data type to the input data type;

dropping intermediate data updates at a network connection between the source node and the destination node, when an intermediate update cannot be handled at the network connection speed and load; and

dropping intermediate data updates at the client node when intermediate update cannot be handled at the client computing speed and load.

5. The method of claim 4, wherein the steps of dropping intermediate data are steps of dropping intermediate data selectively such that the dropped data is overwritten by later data in less than a predetermined time.

6. The method of claim 4, wherein the data updates are image deltas, the data to be updated is image data and the data is periodically checkpointed to nondelta image portions.

7. The method of claim 4, wherein multiple transformations are done as needed to keep the data stream matched to a display of a client and for real-time compression.

8. The method of claim 4, further comprising a step of determining whether a transformation of a data element in the data stream is needed at a node to keep the stream matched to a client display parameter or to transform the data to keep the data being received by the destination node being received substantially in real-time.

9. The method of claim 4, performed by a conference server, at least one presenter client and a plurality of attendee clients.

10. The method of claim 4, further comprising the steps of:
analyzing data in the data stream;
determining if the data is not going to be used by a downstream client
based on the client's update speed and current view space; and
5 if data in the data stream will not be used as determined in the
determining step, dropping the data from the data stream.

11. The method of claim 4, further comprising a step of dynamically
adapting the output data type and input data type to screens and processors used at
10 sources and destinations and to the network connections used.

12. The method of claim 11, further comprising a step of migrating
transcoding processes based on presenter, server and attendee capabilities.

15 13. The method of claim 4, further comprising a step of recording a data
stream for later playback.

14. The method of claim 13, further comprising a step of recording a
voice conversation along with the data stream for later synchronized playback.

20 15. The method of claim 4, wherein the dynamic data is a conference
display, the method further comprising the steps of:

25 dividing a presenter client display into a plurality of frames, wherein the
number of frames used for the presenter client display is a function of network capacity
and presenter client computation resources;

comparing each frame in a current display with a corresponding frame in
a prior display to determine which frames of the plurality of frames are changed
frames;

30 transmitting changed frames from the presenter client, omitting
unchanged frames when necessary to allow a presentation to occur at an attendee client
in substantially real-time.

16. The method of claim 15, wherein the number of frames is dynamic

based on changing network and presenter client conditions.

17. A conferencing client-server system for presenting conferences from a presenter client process to an attendee client process, comprising:

5 a plurality of nodes, wherein each node comprises means for building a data structure for showing a conference;

a network for connecting each of the plurality of nodes to others of the plurality of nodes; and

10 means for adjusting a flow of conference data to each of the plurality of nodes, the flow being adjusted for each node to accommodate the computing resources available at the node and the bandwidth and resources available on the network portion connecting the node.

15 18. A capture frame apparatus for capturing a frame image from a computer having a display, wherein the frame image is a subset of the an image to be displayed by the display, the capture frame apparatus comprising:

means for accepting user input;

20 means for translating user input to boundary positions for boundaries around the frame image, wherein the boundary positions are settable to positions independent of the boundaries of the display and independent of the boundaries of any window on the display; and

means for displaying the frame boundary positions on the display.

25 19. The capture frame apparatus of claim 18, wherein the means for displaying a frame boundary is a display interface programmed to display four one-dimensional windows as four sides of a frame, thereby forming a transparent window.

20. A method for capturing frame image data comprising:

30 copying image data from a frame buffer on a source computer, where the source computer is a computer of a first platform and the image data is in a first image form associated with the first platform;

when a destination computer is a computer of a second platform different

than the first platform and a second image data form associated with the second platform is different than the first image data form, transcoding the image data from the first image data form to the second image data form; and

transporting the image data to the destination computer for display in the second image data form.

5 21. The method of claim 20, wherein the step of copying further compress a step of selecting where in the source computer to perform the copying based on where the image data to be copied is in a transcodable form.

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22. The method of claim 4, wherein dropped intermediate data updates are updates which are obsoleted by later-arriving data updates sent without notice to the sender subsequent to the dropped intermediate data updates being dropped.

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